

REMARKS

Claims 1-13 and 16 are pending. Claim 14-15 stand withdrawn.

Restriction Requirement

In the original restriction requirement, the Examiner alleged that Claims 1 and 14 did not relate to a single inventive concept because Plester discloses “a heat exchanger (18) which is fully capable of heating the treated water in the reservoir (26) to steam and allow[ing] it to flow in the reverse direction through the apparatus.” This assertion is incorrect.

In Applicant’s response of January 23, 2009, Applicant explained:

Plester’s heat exchanger (18) **cools** – it does not heat – water passing from the treatment housing to the reservoir (26) with water being fed to the treatment housing from the water mains. Simultaneously while performing this cooling function, heat exchanger (18) also heats the water from the water mains that is fed to the treatment housing. Even if Plester’s heat exchanger (18) were somehow modified to heat, instead of cool, the water passing from the treatment housing to the reservoir (26) to a level that steam pressure is generated, the heat exchanger would still be incapable of performing the recited function. Specifically, the heat exchanger (18) cannot simultaneously heat water in reservoir (26) while allowing it to flow the reverse direction through the heat exchanger (18). In other words, the heat exchanger (18) cannot transmit heat one direction and steam in the other direction.

The Examiner presents an entirely new theory when responding to Applicant’s foregoing explanation of Plester. The Examiner now argues that by “closing all the valves throughout the apparatus with the reservoir filled with water and the housing consisting essentially of air, the operator may operate the heater (144) allowing the heated air to travel to the water in the reservoir which would create steam and build up pressure in the system.” (Final Office Action, page 11). This assertion is also incorrect.

In a system that is substantially closed to mass flow, as proposed by the Examiner, one would expect very little air flow between two reservoirs which are only connected (fluidly) by a conduit having a relatively small diameter. Because the only path for mass flow between the

heater reservoir and water reservoir is the conduit, a substantial pressure differential between the water reservoir and the air-containing heater reservoir is required to move air through the small-diameter conduit and into the water reservoir. The narrow conduit and collection reservoir both exert significant back pressure to mass flow. Furthermore, since the heater reservoir also has a pressure relief valve, very little head pressure would be generated to drive air flow through the conduit into the reservoir containing the water. Also, the flow of air between the reservoirs would cease once a pressure equilibrium was established in the system. As such, only a small amount of air would move into the water reservoir.

Air, especially in comparison to water, has a very low heat capacity. The air that does pass through the conduit would lose much of its heat through the non-insulated walls of the conduit (the conduit is not insulated because it passes through a heat exchanger). Thus, the small amount of warm air that reaches the water reservoir would have very little thermal energy to transfer to the water. The water, on the other hand, requires a tremendous amount of thermal energy to overcome its latent heat of vaporization to produce steam.

There is simply no technical evidence or sound reasoning which would support the Examiner's theory. According to the Examiner's theory it should be possible to boil water that is in an insulated container by connecting the container to a empty pressure cooker with a long tube and heating the air in the pressure cooker. It is not. As such, Applicant respectfully submits that claims 1 and 14 are related to a single inventive concept and requests reconsideration of the restriction requirement.

Objection to the Specification

The Examiner maintained the objection to the specification for not containing a “Brief Description of the Several Views of the Drawings.” The Examiner contends that the amendment was not provided with Applicant’s response filed on January 23, 2009. Applicant notes that the Amendment to the specification was, in fact, filed and is available on PAIR.

Rejection under 35 U.S.C. § 103

Claims 1, 3-9, 10, 11, 13 and 16 are rejected under 35 U.S.C. § 103(a) as obvious over WO 01/12559 to Plester (hereinafter “Plester”) in view of U.S. Patent No. 4,518,503 to Fermaglich (hereinafter “Fermaglich”). Claim 2 is rejected under 35 U.S.C. § 103(a) as obvious over Plester in view of Fermaglich further in view of U.S. Patent No. 7,089,763 to Forsberg et al. (hereinafter “Forsberg”). Claim 12 is rejected under 35 U.S.C. § 103(a) as obvious over Plester in view of Fermaglich further in view of U.S. Patent No. 5,647,977 to Arnaud (hereinafter “Arnaud”). The rejection is respectfully traversed.

The rejection is predicated on two errors: (1) that Plester’s heat exchanger [18] is capable of heating the treated water to steam and directing the steam in the reverse direction to the water; and (2) that one skilled in the art would be motivated to add Fermaglich’s heater [50] to Plester’s water treatment system to derive Applicant’s claimed invention absent the teachings of Applicant’s specification.

Plester’s heat exchanger is not capable of heating the treated water to steam and directing the steam in the reverse direction to the treated water.

Although the Examiner continues to assert that Plester discloses “a heat exchanger 18 that is in direct communication with the reservoir 121 that is capable of heating the treated water to

steam and directing said steam in the reverse direction of the water,” (Final Office Action, Page 5) this assertion is not supported by sound reasoning or technical evidence.

First, Plester does not explicitly disclose that the heat exchanger is capable of performing the stated functionality. Second, Plester’s heat exchanger does not inherently perform the stated functionality. Plester’s heat exchanger is a counter-flow heat exchanger which cools “treated water” with pre-treated water from the mains. Steam never passes through the heat exchanger (18) when Plester’s water treatment apparatus is used within its normal operating parameters, and Plester provides no mechanism to reverse the flow direction of the treated water. Third, Plester’s heat exchanger 18, even with substantial modification, cannot perform the stated functionality. Assuming, *arguendo*, that one were to modify the heat exchanger (18) to heat (i.e., by modifying Plester’s heat exchanger and providing a new heat source), the heat exchanger (18) cannot simultaneously heat water in reservoir (26) while allowing it to flow the reverse direction through the heat exchanger (18). The heat exchanger (18) cannot transmit heat one direction and steam in the other direction.

The Examiner has failed to establish a *prima facie* case of obviousness

The Examiner has failed to provide any sound reasoning as to why one skilled in the art would be motivated to add Fermaglich’s heater [50] to Plester’s water treatment system to derive Applicant’s claimed invention absent the teachings of Applicant’s specification

Initially, Applicant notes that none of the cited references disclose a water treatment apparatus capable of self-sanitization. Although Plester and Fermaglich are each directed to a water treatment apparatus, neither reference teaches or discloses the functionality “whereby steam may be passed through the apparatus in the reverse direction to the water” (the water being

specifically claimed to pass from the housing to the reservoir). The Examiner argues that although neither reference teaches this element, “Plester in view of Fermaglich is fully capable of self sanitization.” (Final Office Action, Page 12). Applicant respectfully submits that if one were not motivated by the desire to provide a self-sanitizing functionality to a water treatment apparatus (a concept only taught by the Applicant), one would not have any reason to add Fermaglich’s heater to Plester’s water treatment apparatus as suggested by the Examiner. Instead, the Examiner suggests one would be motivated to add Fermaglich’s heater to Plester’s water treatment apparatus to “enhance the purification of the water as exemplified by Fermaglich.” (Final Office Action, page 6). As detailed below, such a motivation would not lead one skilled in the art to derive Applicants’ claimed invention.

First, Plester lacks any clear deficiency that would be solved by the addition of Fermaglich’s heater. Although the Examiner asserts that Fermaglich is only capable of removing low molecular weight pollutants (VOCs) and metallic salts – not high molecular weight hydrocarbons (Final Office Action, page 14), the Examiner has provided no technical evidence or sound reasoning for this assertion. On the contrary, Plester discloses that the disclosed water treatment device provides water to the storage tank 26 “without the need for additional treatment.” (Page 14, lines 8-11). As such, one skilled in the art would not be motivated to modify Plester’s device to “enhance the purification of the water” since there simply is no “need.”

Second, assuming one were motivated to enhance the purification provided by Plester’s water treatment device in view of the teachings of Fermaglich, a much simpler modification – the substitution of Fermaglich’s activated carbon filter 12 for Plester’s filter 22 – would be the most

practical and efficient option. Fermaglich teaches that “the *heated* activated carbon filter 12 is particularly effective in removing heavy molecular pollutants, such as hydrocarbons.” (Page 4, lines 48-50, emphasis added). Plester, on the other hand, teaches that “[t]he filter 22 is arranged to be in contact with either the internal heater 6 or alternatively, the heating-mantle 6a.” Accordingly, if one skilled in the art believed Plester’s water treatment device was not sufficiently effective at removing high molecular weight hydrocarbons, Applicant respectfully submits that one would simply employ an activated carbon filter (exposed to the primary heating source) rather than reheating previously-cooled treated water and reversing its flow through the apparatus. There are several reasons for this:

- Lower energy costs – The modification suggested by the Examiner requires reheating water which has already been cooled, whereas the substitution of an activated carbon filter for Plester’s filter 22 would not require additional heat.
- Lower equipment costs – The modification suggested by the Examiner requires an additional heater to be placed in the reservoir, whereas no additional heating elements are required to change filters.
- Continuous instead of batch process – The modification suggested by the Examiner must be performed as a batch process since only one conduit connects the two reservoirs, whereas a continuous process may be employed if only the filter is changed.

In view of the foregoing considerations, the motivation of “enhanc[ing] the purification of the water” would lead to the substitution of filters rather than a complete redesign of the treatment staging of Plester’s water treatment apparatus.

The Examiner's assertion that continuous re-vaporization and re-filtration of the water would yield a more "pure" water product (Final Office Action, page 14) overlooks (1) Plester's clear statement that no additional treatment is needed (which expressly teaches away from the addition of any later treatment stages), and (2) the aforementioned disadvantages of adding such additional treatment stages. This is particularly true since it would be less expensive and complex to simply heat and vent the water for a longer period of time to release more VOCs than to heat, then condense, then reheat in a process that transfers the water back and forth between the reservoirs. Furthermore, it is not clear what advantage would be gained from reversing the flow through the filter and then re-reversing the flow through the filter (a third time). It is submitted that the third pass through the filter may dislodge from the filter particulates which were trapped near the downstream surface of the filter on the second pass. Likewise, the second pass through the filter (the reverse direction) may dislodge from the filter particulates which were trapped near the upstream surface of the filter in the first pass. The utilization of multiple filters or a larger filter would clearly be more efficient.

Third, the modified treatment scheme proposed by the Examiner is not analogous to the treatment scheme employed by Fermaglich using Fermaglich's evaporator (14). Fermaglich teaches using steam pressure in the headspace of the evaporator (14) to transfer liquid water and latent heat to another container where the heat distills the water, causing components more volatile than the water to vent to the atmosphere. The steam produced by the evaporator flows through the passage means (72) into the condenser (18). Because the fluid connection (46) extends between the bottom of the evaporator (14) and the bottom of the container/housing (24), only heated, liquid water would be exchanged between the evaporator (14) and the housing (24).

Fermaglich does not disclose passing steam in the reverse direction as treated water. As such, if one were to modify Plester in a manner consistent with Fermaglich, heated water – *not steam* – would flow in the reverse direction while steam would be allowed to vent directly from Plester's collection reservoir (26) to the atmosphere.

Applicant respectfully submits that the only conceivable reason to circulate steam in a reverse direction to the water in Plester's apparatus would be for the purpose of sanitizing the apparatus – not adding a duplicative water treatment stage. Such a modification would not be made without hindsight bias.

Conclusions

Based on the foregoing, Applicant submits that the claims are in condition for allowance. If there are any issues which can be resolved by a telephone conference or an examiner's amendment, the examiner is invited to call the undersigned attorney at 404.853.8066.

Respectfully submitted

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